



## Case report

## A case of atypical chronic subdural hematoma: A spontaneous rupture of dural lymphoma nodule



Lucia Barrios, M.D. Forensic Examiner<sup>a</sup>, Renaud Clément, M.D., M.Sc. Forensic Examiner<sup>a,\*</sup>,  
Guillaume Visseaux, M.D. Forensic Examiner<sup>a</sup>, Eric Bord, M.D. Neurosurgeon<sup>b</sup>,  
Francois Le Gall, M.D. Pathologist<sup>c</sup>, Olivier Rodat, M.D., Ph.D. Forensic Examiner<sup>a</sup>

<sup>a</sup> Laboratory of Forensic Medicine, Faculty of Medicine, 1 rue Gaston Veil, 44035 Nantes cedex, France

<sup>b</sup> Unit of Neurosurgery, CHU of Nantes, 1 place alexis Ricordeau, 44093 Nantes cedex 1, France

<sup>c</sup> Laboratory of Histopathology, Faculty of Medicine, 2 Avenue du Professeur Léon Bernard, 35043 Rennes cedex, France

## ARTICLE INFO

## Article history:

Received 12 March 2013

Received in revised form

8 October 2013

Accepted 7 December 2013

Available online 18 December 2013

## Keywords:

Chronic subdural hematoma

Lymphoma

Effusion

Hemorrhage

Forensic medicine

## ABSTRACT

In forensic medicine, a chronic subdural hematoma (SDH) usually results from trauma, sometimes minimal for elderly people. The case reported here is a forensic medical description of an atypical chronic subdural hematoma. A woman aged of 40-year-old died following a coma. The autopsy and histological analyses revealed the hemorrhagic disintegration of a lymphoid nodule, a metastasis from generalized lymphoma. The combination of chronic symptomatic SDH and a tumor of the dura mater have been described, but are very rare. The possibility of trauma, even minimal, has never been excluded in these cases. In fact, the clinical picture of these patients suggested a significant movement of the brain within the cranial cavity due to the physiological decrease in brain volume. In the reported case, this particular process was excluded since the spontaneous hemorrhagic effusion produced by the meningeal lymphoid nodule was the cause of the chronic SDH. This pathophysiological explanation was possible because the entire brain and meninges were removed for histological analysis. Trauma, even minimal trauma, is not always involved in the formation of a chronic SDH.

© 2013 Elsevier Ltd and Faculty of Forensic and Legal Medicine. All rights reserved.

## 1. Introduction

Subdural hematoma (SDH) is one of the classical intracranial injuries and its frequency is high, especially in case of fatal head trauma. SDH is a collection of blood below the inner layer of the dura but external to the brain and arachnoid membrane. Pathophysiological of SDH results usually from the rupture of the cerebral bridge veins of the meninges.<sup>1</sup> In forensic medicine, the most common cause of a subdural hematoma is some form of direct impact trauma either as the result of an assault, or fall.<sup>1–3</sup>

Depending on the speed of their onset, classification is divided into acute, subacute and chronic SDH which is developed over a period of days to weeks. Sometimes, tear of cerebral bridge veins could be due to minor trauma, such as those encountered in the impacts of everyday life. In this case, cortical bridging veins are assumed to be under greater tension as the brain gradually shrinks from the skull. Likewise, chronic SDH could be discovered

unexpectedly during a forensic autopsy. Subdural hematomas can be referred as spontaneous. Sporadic cases are reported and listed in medical literature. Coagulopathy sometimes associated with malignancy has been described with chronic SDH without any trauma intervention. The following case history is a chronic and atypical SDH to be reported in forensic medicine probably without trauma connected. These cases often have an arterial source and they are usually associated with the same pathology as that involved in subarachnoid or intracerebral hemorrhage.

## 2. Case history

A 40-year-old Caucasian woman went to stay a couple of weeks in an African country. Her medical history included local radiation therapy to the treat a breast cancer several years before. She had been in complete remission over a year. The last oncologist consultation was strictly normal. This young woman's state of health presented constitutional hemostasis disorders. She had von Willebrand disease with a low degree of bleeding tendency. A unique cause of excess hemorrhage was reported after the delivery of her last daughter. Any medication wasn't prescribed to this

\* Corresponding author. Laboratoire de Médecine Légale, Faculté de Médecine, 1 rue Gaston Veil, 44035 Nantes, France. Tel.: +33 2 40 41 28 33; fax: +33 2 40 20 32 08.  
E-mail address: [renaud.clement@univ-nantes.fr](mailto:renaud.clement@univ-nantes.fr) (R. Clément).

hereditary coagulation abnormality. She had no known addictive tendencies.

Several days after her arrival, she had paroxysmal hyperthermia, accompanied a few hours later by photophobia, difficulty in walking and confusion. The diagnosis of pernicious malaria was suggested, but her neurological condition worsened with a coma (Glasgow score of 6). After several hours, she was taken in charge by ambulance to local hospital. Resuscitation measures did not prevent the patient's death in hospital. A local autopsy concluded that death was caused by pneumonia. The transportation to hospital took more time than family's waiting for, they lodged a complaint against French insurance. Following cold storage, the victim's body was repatriated to France, and an autopsy was performed in our laboratory.

External examination of the body showed that this woman was 165 cm in height and weighed 56 kg. Bruising was present around the vascular access sites. The examination of the skull and face did not reveal any injuries from blows or wounds. On opening the cranial space, a subdural hematoma forming a right hemispheric biconvex lens was discovered (Fig. 1). It weighed 90 g, was wine red in color and consisted of an encapsulated collection with liquefaction (Fig. 2). The examination of the deep surface of the scalp did not uncover any traumatic lesion. Neither the vault nor the base of the cranium showed a fracture. The brain weighed 1295 g and appeared normal in cross section. The macroscopic examination of the other organs was normal and unremarkable.

Our preliminary report indicated that the death resulted from a chronic SDH rose up by hereditary coagulopathy following a simple bump that went unnoticed. Relatives gave no indication of anything traumatic in the several weeks preceding her death.

Histological investigations then uncovered a multi-organ, generalized lymphoid infiltration (heart, lungs, kidneys, spleen, liver, and thyroid) by a small-cell lymphoma (Fig. 3). The examination of the cerebral cortex showed these lymphoid infiltrations as well (Fig. 4). A small-cell lymphoid nodule, disrupted by erythrocytes was found in the falx cerebri of the meninges (Fig. 5). The immune markers CD03, CD20 and CD038 were negative, but the interpretation of the results was made difficult by the autolysis phenomena of the tissues examined. The examination of the SDH using light microscopy showed the criteria of chronicity. Toxicological examinations (cardiac and peripheral bloods, urine, and vitreous humor) did not reveal any recent or old consumption of toxic substances such as cocaine or alcohol.

Following these additional investigations our conclusion stated that chronic right circumferential SDH was the cause of death. This hematoma rose up by von Willebrand disease originated with the "spontaneous" hemorrhagic rupture of a nodule of lymphoid



Fig. 2. Encapsulated SDH collection with liquefaction.

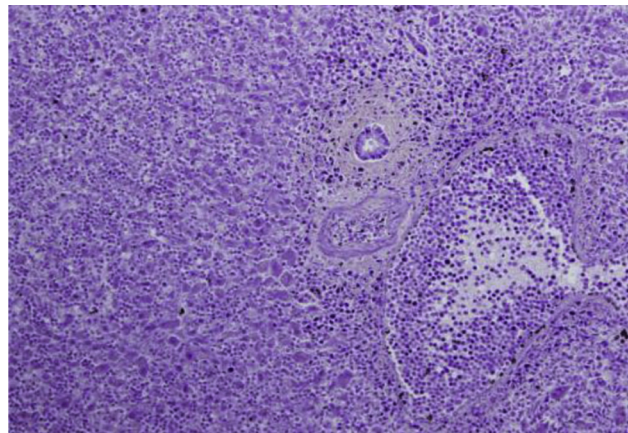


Fig. 3. Generalized lymphoid infiltration in liver (×20).

infiltrate in the meninges of the falx cerebri. The idea of even minor trauma could be rejected in our final report.

### 3. Discussion

Chronic SDH occur more frequently in men,<sup>4</sup> in the elderly,<sup>3–6</sup> and in patients taking anticoagulant<sup>6,7</sup> or platelet aggregation inhibiting drugs.<sup>8</sup> The consumption of alcohol is also a predisposing factor. Minimal trauma could cause CSDH in the elderly. Due to the decrease in the volume of the brain with age, movements of the brain within the cranial cavity become more significant.<sup>1,9,10</sup> In studies on the origins of chronic SDH, incidence of trauma is found in 52–75% of cases.<sup>4</sup> In a large series of patients treated to Chronic

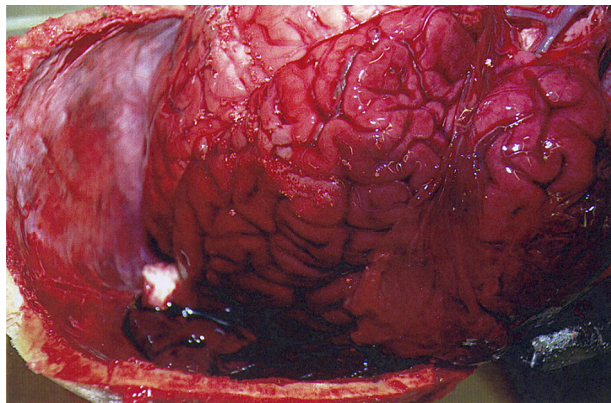


Fig. 1. Right Subdural hematoma.

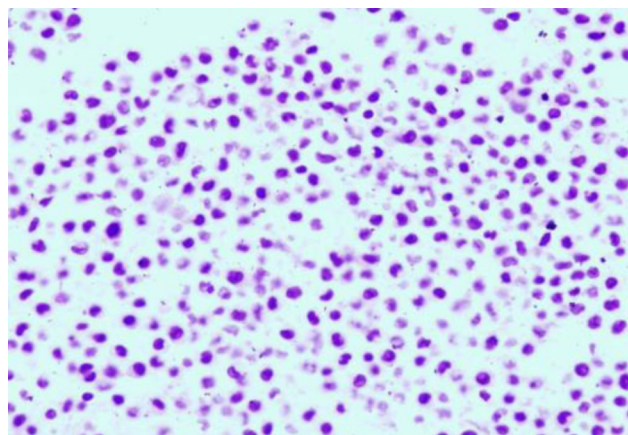


Fig. 4. Lymphoid nodule in dural matter (×40).



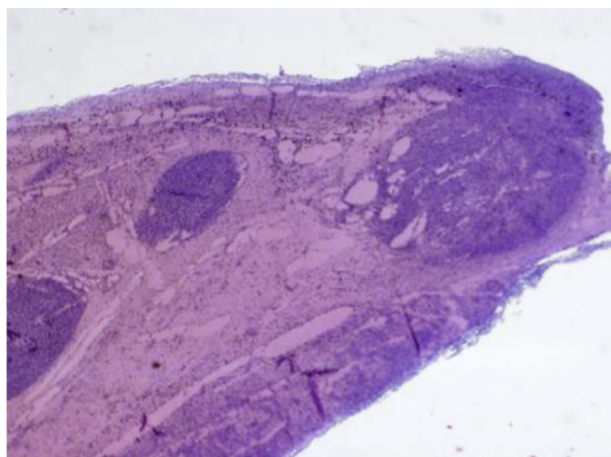


Fig. 5. Disrupted nodule by erythrocytes in falx cerebri of the meninges (×2).

SDH, one quarter to one half have no identifiable history of head trauma. And in case of head trauma, it was usually mild. 3% of them had coagulopathy causes, due to malignant tumor and/or disseminated intravascular coagulopathy. Originate of chronic SDH is still incompletely understood.

Several cases of atypical chronic SDH were characterized by the presence of pre-existing pathological dural lesions, especially cancerous ones.<sup>11</sup> These tumors can result from primitive neoplasias of the central nervous system in the meninges or from dural metastases of cancers. The frequency of metastases of the dura mater for cancers of the carcinoma type are respectively 19.5% for the prostate, 16.5% for the breast, 11.1% for the lungs and 7.5% for the stomach.<sup>12</sup> The combination of a metastasis of the dura mater and a chronic SDH is possible but extremely rare. In fact, some 70 cases of chronic SDH classified as atypical with metastases in the dura mater, have been identified, three involved lymphomas.<sup>13–15</sup> Two were identified in over 50-year-old men and the other one was found in an 80-year-old woman. Minimal trauma was mentioned and may have led to a chronic SDH.

In a series of 27 cases (surgery and autopsies) presenting dural metastases, only five were accompanied by a co-existing SDH, and three of them were histologically chronic.<sup>16</sup> These collections were small and, according to the author, could not have led to neurological signs. Three chronic SDH involved men between 50 and 66 years old and were also unexpected discoveries. This descriptive report could not explain this association.

In the reported case, several forensic medical elements contributed to the atypical nature of this chronic SDH: no mild identified trauma reported, a young forty-year-old woman, status of non-menopausal, no chronic or acute consumer of alcohol and interference of coagulation by von Willebrand disease.

There is no reason to believe there was a minimal and unnoticed trauma here. It couldn't have caused a tear in the veins of the cerebral bridge, because stretching of the bridging veins didn't pre-existed in this young woman. The movement of the brain within the cranial space was very limited, because cerebral volume had been maintained. The great majority of reported cases of atypical chronic SDH involve elderly people and hypothesis of trauma, even if minimal leading to displacement of the brain within the cranial space was suggested.

Other mechanisms causing chronic atypical SDH with metastases of the dura mater have been proposed, such as venous obstruction in the dura mater caused by a secondary tumor, metastatic hemorrhagic effusion as well as angiodermoplasty of the

dura mater in response to a cancerous invasion.<sup>17</sup> These phenomena make “spontaneous” hemorrhagic rupture of the lymphoid nodule quite possible in this case, while excluding a traumatic origin. The histological experts believe this was a case of hemorrhagic effusion from the lymphoid nodule. In fact, erythrocytes had disintegrated the lymphoid nodule.

At the time of any discovery of a chronic SDH during an autopsy in a young adult in which there is no indication of mild trauma or violent injury, it is imperative to remove both the entire brain and all the meninges for histological analyses. Histological examinations may reveal a cancerous nodule or a pre-existing vascular pathology.<sup>18</sup> In the absence of such samples and examinations, the finding of a chronic SDH in a young adult cannot be adequately explained, especially when investigations do not reveal physical evidence of any trauma. Chronic SDH will then be falsely imputed to a minor shock that did not leave any physical trace, and being so minor, has gone unnoticed.

#### Ethical approval

None declared.

#### Funding

None declared.

#### Conflict of interest

None declared.

#### References

- DiMaio VJ, DiMaio D. Trauma of the skull and the brain: craniocerebral injuries. In: Geberth VJ, editor. *Forensic pathology*. 2nd ed. Boca Raton, FL: CRC Press; 2001. pp. 147–83.
- Knight B, Saukko P. Intracranial injuries. In: *Knight's forensic pathology*. 3rd ed. London, England: Arnold Publishers; 2004. pp. 189–221.
- Trotter W. Chronic subdural haemorrhage of traumatic origin, and its relation to pachymeningitis haemorrhagica interna. *Br J Surg* 1914;2:271–91.
- Baechli H, Nordmann A, Bucher HC, Gratzl O. Demographics and prevalent risk factors of chronic subdural haematoma: results of a large single-center cohort study. *Neurosurg Rev* 2004;27(4):263–6.
- Asghar M, Adhiyaman V, Greenway MW, Bhowmick BK, Bates A. Chronic subdural haematoma in the elderly – a North Wales experience. *J R Soc Med* 2002;95:290–2.
- Tagle P, Mery F, Torrealba G, Del Villar S, Carmona H, Campos M, et al. A chronic subdural hematoma: a disease of elderly people. *Rev Med Chil* 2003;131:177–82.
- Gonugunta V, Buxton N, Warfarin and chronic subdural haematomas. *Br J Neurosurg* 2001;15:514–7.
- Reymond MA, Marbet G, Radü EW, Gratzl O. Aspirin as a risk factor for hemorrhage in patients with head injuries. *Neurosurg Rev* 1992;15:21–5.
- Fogelholm R, Heiskanen O, Waltimo O. Chronic subdural haematoma in adults: influence of patient's age on symptoms, signs, and thickness of haematoma. *J Neurosurg* 1975;42:43–6.
- Ellis GL. Subdural haematoma in the elderly. *Emerg Med Clin North Am* 1990;8:281–94.
- Tseng SH, Liao CC, Lin SM, Chen Y, Shun CT. Dural metastasis in patients with malignant neoplasm and chronic subdural hematoma. *Acta Neurol Scand* 2003;108(1):43–6.
- Laigle-Donadey F, Taillibert S, Mokhtari K, Hildebrand J, Delattre JY. Dural metastases. *J Neurooncol* 2005;75:57–61.
- Gotoh M, Tsuno K, Handa A, Nishiura T, Ishimitsu H, Nishida A. Extra-axial primary malignant lymphoma associated with calcified chronic subdural hematoma: a case report. *No Shinkei Geka* 2001;29(3):259–64.
- Reyes MG, Homsí MF, Mandkornkanong M, Stone J, Glick RP. Malignant lymphoma presenting as a chronic subdural hematoma. *Surg Neurol* 1990;33:35–6.
- Alimehmeti R, Locatelli M. Epidural B cell non-Hodgkin's lymphoma associated with chronic subdural hematoma. *Surg Neurol* 2002;57(3):179–82.
- Kleinschmidt-DeMasters BK. Dural metastases. A retrospective surgical and autopsy series. *Arch Pathol Lab Med* 2001;125(7):880–7.
- Cheng CLY, Greenberg J, Hoover LA. Prostatic adenocarcinoma metastatic to chronic subdural hematoma membranes. *J Neurosurg* 1998;88:642–4.
- Yokote H, Terada T, Nakai K, Itakura T. Subdural and meaningful involvement related to Wegener's granulomatosis: case report. *Neurosurgery* 1997;40(5):1071–4.